Link to the latest *Jobs Online* Quarterly report

https://www.mbie.govt.nz/business-and-employment/employment-and-skills/labour-market-reports-data-and-analysis/jobs-online/jobs-online-quarterly-report

What is *Jobs Online?*

Job vacancies are measured through *Jobs Online* by using job advertisements as a proxy for job vacancies. *Jobs Online* measures changes in online job advertisements from four internet job boards: SEEK, Trade Me Jobs, the Education Gazette and Kiwi Health Jobs. *Jobs Online* provides a key indicator of labour demand though vacancies by industry, occupation, skill-level and region.

In December 2009, the first *Jobs Online* monthly report was released by a predecessor of the Ministry of Business, Innovation, and Employment (MBIE). The vacancies were sourced from two major job boards – Trademe Jobs and Seek. National vacancies were published by five regions, eight industries, and eight occupations. The *Jobs Online* indices focussed on skilled vacancies (SVI) as internet vacancies from the two job boards were more representative of skilled job ads. The *Jobs Online* series has also undergone review and update of the seasonal adjustment process.

In March 2018, the first *Jobs Online* quarterly report was released by MBIE. The source of vacancies expanded from two major job boards to include two specialist job boards – Education Gazette (Education) and KiwiHealth Jobs (Health). This meant that *Jobs Online* now has coverage of both skilled and unskilled vacancies, and allows a more granular break-down of regional data, supporting in-depth analysis of regional vacancy trends. The *Jobs Online* indices now focus on the all vacancies indices (AVI).

Three versions of the data series are now available:
1. monthly since May 2007, nationally by five regions, industry, occupation and skills
2. monthly since August 2010, nationally by ten regions, industry, occupation and skills
3. quarterly since December 2010, nationally and ten regions by industry, occupation and skills.

There is growing recognition Big Data from administrative data provides insights about the labour market. Technological developments in advertising vacancies include the use of social media for business purposes; and data scraping of internet sites by third parties. *Jobs Online* contributes to the international understanding of monitoring vacancies. In 2016, MBIE presented to an international conference on Big data in the United States of America. As a next step MBIE intends to investigate the changing skill demand and requirements in jobs.

What method is used to produce *Jobs Online?*

Jobs Online brings together job advertisements from four online job boards into an index, reported by key breakdowns for the AVI. This section outlines the processes and methods used in Jobs Online.

Receiving the data: Data files are received from Trade Me Jobs, Education Gazette and KiwiHealth Jobs within a few days of the end of the month and contain all new job ads that are listed in the month. The data for SEEK (NZ) is part of a package that is submitted to the Department of Employment (DE) in Australia for the Australian Internet Vacancy Index and is extracted directly from the DE server within a few days after the end of the month. Vacancies are collated using an auto-coder – The data is cleaned, combined, duplicates are removed, coded to occupation, skills, industry and region, aggregated, summed over three month, seasonally adjusted, KiwiHealth Jobs is spliced and converted to an index.

Vacancies coded to an occupation standard: Each of the job vacancies are coded to an occupation (4-digit Australian and New Zealand Standard Classification of Occupations – ANZSCO) that enables comparison of the data with other labour market statistics. An auto-coder uses a mix of matching techniques that essentially look for key words in the job title. DE in Australia uses a similar auto-coding technique.

Quality control and duplicate removal: Quality control steps are embedded in the SAS code, such as data cleaning, converting all alpha characters to upper case, removal of non-alphanumeric characters, and removal of blanks except one space between words. The results of the occupational auto-coder are audited as an iterative process to improve data quality. Duplicates are removed from the dataset when there is duplication of job ads in two consecutive months, within site and between sites.

Seasonal adjustment: *Jobs Online* uses the trend series for reporting. All seasonally adjusted and trend series for *Jobs Online* are produced using the X-12-ARIMA package developed by the US Bureau of the Census. Two methods are used for the monthly and quarterly seasonal adjustment.

Monthly seasonal adjustment removes the effects of trading days, and Easter and has an adjustable moving average filter. The quarterly seasonal adjustment is simpler, as trading effects and Easter adjustments are no longer relevant for the quarterly data.
https://www.mbie.govt.nz/dmsdocument/3927-change-to-the-seasonal-adjustment-process-for-jobs-online-pdf

Splicing of Kiwi Health Jobs data: KiwiHealth Jobs data is spliced into the *Jobs Online* index in May 2011. KiwiHealth data is only available from May 2011. The original series prior to May 2011 is adjusted by a ratio calculated in the first month KiwiHealth Jobs appeared. The ratio takes into account the difference in the ratio before and after KiwiHealth Jobs is introduced.

Vacancies presented as an index: Finally, the data is presented as an index. When an index or percentage change is only published if it includes data from at least two providers.

The quarterly outputs are presented as an index with a base quarter of 100 for December 2010. A quarter by quarter change is calculated from the base quarter, as follows:

$$\text{Index} = \frac{\text{New quarter} - \text{Base quarter}}{\text{Base quarter}}$$

The original monthly series has a base month of May 2007, while the current monthly series has a base of August 2010.

How does MBIE use Jobs Online?

This section outlines how MBIE uses *Jobs Online* and *compares Jobs Online with other indicators of labour market performance.*

Ministerial purposes: *Jobs Online* provides the Ministers with valuable advice and information on labour market conditions in a timely manner. MBIE uses *Jobs Online* information along with other quantitative and qualitative information to assess employment growth in the short term. MBIE publishes these findings on its external website and in the quarterly report called "Quarterly Labour Market report" and the "Occupation Outlook".

Policy decisions about the labour market: *Jobs Online* provides valuable information to support policy decisions related to the labour market. Coding the job advertisements in *Jobs Online* to a 4-digit ANZSCO occupation enables them to be used to identify skill shortages at the four digit occupation group level.

Jobs Online contributes to Immigration NZ's annual review of the Essential Skills in Demand List (ESDL). *Jobs Online* information is used along with other quantitative and qualitative information to determine if an occupation on the ESDL will stay, be added or deleted from the list. Where an occupation is identified as being in shortage, the occupation may be added to an ESID list, making it easier for employers to attract migrants from overseas to fill job vacancies for those occupations.

1. Comparison with other indicators of labour market performance

Unemployment and vacancy rates – Beveridge curve: Figure 1 shows an empirical analysis of the Beveridge curve using ten and a half years of *Jobs Online* vacancy data. The Beveridge curve shows a strong relationship between the vacancy and unemployment rate. An MBIE analysis of the relationship suggests a high vacancy rate is associated with a low unemployment rate and a low vacancy rate is associated with a high unemployment rate. The use of the vacancies as a leading indicator of unemployment needs further investigation.

Figure 1: Beveridge curve
September 2007 and March 2018 quarter
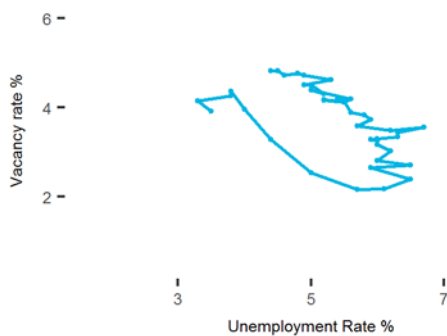
Source: *Jobs Online*, MBIE and HLFS, Statistics NZ

AVI compares well with labour turnover: As expected, Figure 2 shows the AVI against the QSBO's net balance of responses from employers about labour turnover in the QSBO. The chart shows that there is a strong positive correlation between AVI and labour turnover.

Figure 2: AVI and labour turnover: seasonally adjusted
September 2007 and March 2018 quarter
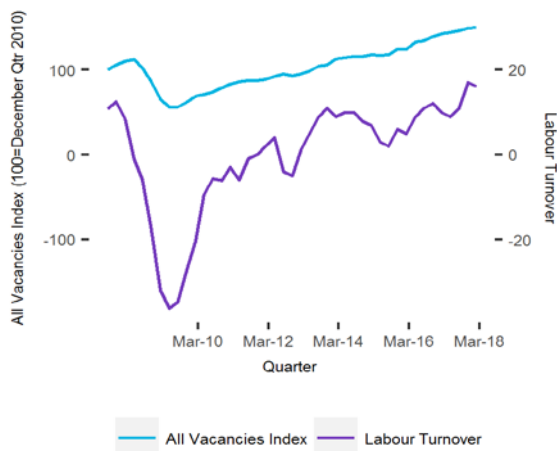
Source: Jobs Online, MBIE and QSBO, NZIER

Jobs Online compares well with AVI compares well with difficulty finding labour: The AVI is compared against the net balance of responses from employers about the difficulty in finding skilled and unskilled labour in the QSBO in Figure 3. There was a negative correlation of at least 0.85 between vacancy growth and annual changes in the net balance of responses for both skilled and unskilled labour. An increase in advertised vacancies coincided with an increase in the difficulty in finding skilled and unskilled labour as shown in Figure 3. High vacancy growth tends to be associated with greater difficulty in finding skilled and unskilled staff.

Figure 3: All Vacancies Index (AVI) and difficulty finding skilled and unskilled labour (seasonally adjusted)
September 2007 and March 2018 quarter
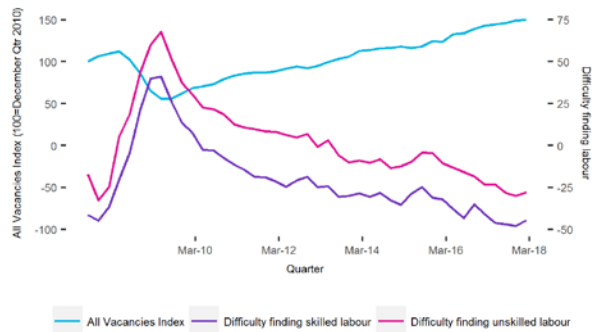
Source: *Jobs Online*, MBIE and QSBO, NZIER

Employment intentions: MBIE investigated the relationship between the AVI and employment intentions. The intention of employers to hire more people in the next twelve months (employment intentions) is measured by ANZ Business Outlook Survey. Overall, employment intentions provide an explanation with moderate power of the variation in the AVI.

Figure 4: All vacancy and employment intentions, 2008-2014

Appendix: Definitions

Advertisement: Vacancies that are advertised on the job boards of SEEK, Trade Me Jobs, Kiwi Health Jobs and Education Gazette (and other job boards as this data becomes available).

ANZSCO: Australia New Zealand Standard Classification of Occupations. ANZSCO is a skill-based classification of occupations. The structure of ANZSCO has five hierarchical levels. The highest level (1-digit) contains eight major groups and each level progressively divides into more specialised occupations.

Auto-coder: A Statistical Analysis Software (SAS) programme that automatically codes job titles and job descriptions to a 4-digit ANZSCO code.

AVI: All Vacancies Index. An index based on all job ads in *Jobs Online*. The AVI is the main output of *Jobs Online* and includes all vacancies in occupations that have a skill level of 1-5 under the ANZSCO.

Data provider: The data providers for *Jobs Online* are SEEK, Trade Me Jobs, KiwiHealth Jobs, and Education Gazette (and other providers as this data becomes available).

DE: Australia's Department of Employment.

Duplicates: Duplicates refer to the duplicate advertisements across two consecutive months, within sites and between sites. Jobs are identified as duplicates if they appear in the same month, have the same region, job title and job description (shortened).

Industry: Industry categories are an amalgamation of those used by the respective data providers. The industry is selected from a list of categories by the person placing the job advertisement, and is not related to any official industry classification. The industry categories are business, legal, admin and support services; construction and engineering; education and training; health care and medical services; hospitality and tourism; information and technology; manufacturing; transport and logistics; primary industries; sales, retail, marketing and advertising and other.

Jobs Online: *Jobs Online* is a package of tools and reports that provide information on the labour market. This includes the All Vacancy Index, a Background and Methodology paper, monthly data releases and quarterly reports on the labour market.

Jobs Online monthly data release: The monthly data release uses monthly data for ten regions. The base year is August 2010. The monthly data release for *Jobs Online* will be published every month.

Jobs Online long term data release: The long term series uses monthly data from five regions , industry, occupation and skills. The base year is May 2007. The long term data release for *Jobs Online* will be published every month.

Jobs Online quarterly report: The quarterly report uses vacancy data (summed over three months). The base year is December 2010. The summing enables further in-depth analysis. December 2010 is the first available quarter with all three months (October, November, and December) by the ten regions was December 2010. The quarterly report for *Jobs Online* will use the summed data in the reports published in January, April, July and October.

Occupation: Vacancies that have been advertised on the job boards are coded to 4-digit ANZSCO. The occupation groups reported on are managers, professionals, technicians and trades workers, clerical and administrative workers, community and personal service workers, sales workers, machinery operators and drivers and labourers.

Region: Ten regions: data is available for the following regions from 2010: Auckland, Bay of Plenty, Canterbury, Gisborne/Hawke's Bay, Manawatu-Wanganui/Taranaki, Northland, Waikato, Nelson/Tasman/Marlborough/West Coast and Otago/Southland and Wellington.

Five regions: data is available from May 2007 for Auckland Wellington, Canterbury, other South Island and other North Island)

Skilled occupation: ANZSCO has five skill levels underlying its occupational structure. An occupation is a skilled occupation if it has an ANZSCO skill level of 3 (a skill level commensurate with an NCEA level 4 qualification) or above. The five skill levels are highly skilled, skilled, semi-skilled, low skilled and unskilled.

Skilled and Unskilled occupations: The five skill levels are aggregated into Skilled (highly skilled, skilled, semi-skilled) and Unskilled (low skilled and unskilled).